# From Photopyroelectric AC Calorimetry of Phase Transitions to Thermal Spectroscopy of Glass Forming Liquids

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About five years ago we developed a novel photopyroelectric (PPE) AC type calorimetric setup allowing absolute measurements of the specific heat capacity and thermal conductivity of liquids and gases [1,2]. This PPE AC calorimetric technique allows high-resolution specific heat capacity investigations near phase transitions [3]. Results will be presented for critical and tricritical transitions in liquid crystals. In a recent development using different photopyroelectric configurations, we experimentally studied the frequency dependence of the thermal properties of glass forming liquids near the glass transition [4]. This has allowed us to unambiguously and separately deduce the frequency dependence of the specific heat capacity and the thermal conductivity. Results for glycerol show that, within an experimental uncertainty between 0.1 Hz and 1100 Hz, the thermal conductivity does not show frequency dependence, and that all the frequency dependence resides in the specific heat capacity. Results for other glass formers will also be presented. By applying the PPE technique, the heat capacity spectroscopy frequency range could also be extended with more than one decade up to 100 kHz. [1] J. Caerels, C. Glorieux, and J. Thoen, Rev. Sci. Instrum. 69, 2452 (1998). [2] J. Caerels, C. Glorieux, and J. Thoen, Rev. Sci. Instrum. 71, 3506 (2000). [3] J. Caerels, C. Glorieux, and J. Thoen, Phys. Rev. E 65, 031704 (2002). [4] E.H. Bentefour, C. Glorieux, M. Chirtoc, and J. Thoen, to be published.